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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,534	10/08/2003	Rainer Bunis	SGL 02/25	7490

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EXAMINER	
MAYES, MELVIN C	

ART UNIT	PAPER NUMBER
1734	

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/681,534	BUNIS ET AL.	
	Examiner	Art Unit	
	Melvin Curtis Mayes	1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 10/8/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

(1)

Applicant is advised that should claim 27 be found allowable, claim 28 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

(2)

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(3)

Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 claims steps of "separating a region of each of the shaped tapes..." and "inserting the shaped tapes into a clamping device..." but it is not clear at what point these steps are performed. Based on the specification, it appears that these steps are performed during the "juxtaposing" step. Claim 1 would be clear if read "characterized in that the juxtaposing comprises the steps of separating a region of each of the shaped tapes outside the contact zones

from adjoining tapes with graphite spacers and inserting the shaped tapes into a clamping device formed substantially of graphite to secure the tapes and the prebody formed therefrom" or similar language to make it clear when these steps are performed with respect to the steps of "producing" "juxtaposing" "producing" "carbonizing" and "post-compacting."

Claim Rejections - 35 USC § 103

(4)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

(5)

Claims 1-11, 18-22 and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 05-124874 in view of JP 59-69410.

JP 05-124874 discloses a method of making a carbon fiber/carbon honeycomb comprising: providing ribbons of prepreg of phenolic resin in carbon fiber paper; laminating the sheets to produce a precursor of a honeycomb; putting the precursor in a graphite vessel having graphite particles filled in the vessel to embed the precursor in the particles; applying pressure; and carbonizing in an inert atmosphere. The graphite particles prevent contraction or deformation of the honeycomb. The adhesion between the ribbons is by use of the same phenol resin. The carbon fibers in some sheets are random while in other sheets have a 45-degree fiber orientation (Abstract and computer translation). JP '874 does not disclose carbonizing at between 750 and 1200°C followed by post-compacting by introducing a substance forming a carbon residue and carbonizing.

JP 59-69410 teaches that in the conventional process of making a carbon-carbon fiber composite material, the laminated body of prepregs of carbon fiber fabrics impregnated with phenol resin is first heated while being pressed to form a cured, shaped body, next subjected to carbonization at 450-900°C, then subjected to graphitization followed by pitch impregnation and repeating carbonization and graphitization until a desired specific gravity is reached (translation, pg. 2, paragraph 3).

It would have been obvious to one of ordinary skill in the art to have modified the method of JP '874 for making a carbon fiber/carbon honeycomb by carbonizing the honeycomb at a temperature in the range of 450-900°C, encompassing a temperature in the claimed range of 750-1200°C, followed by pitch impregnation and carbonization, as taught by JP '410, as the conventional process of making a carbon-carbon fiber composite material from prepregs of carbon fiber fabrics impregnated with phenol resin. Adhering the ribbons by phenol resin by applying heat and pressure would have been obvious to one of ordinary skill in the art, as JP '410 teaches that laminated prepregs of carbon fiber fabrics impregnated with phenol resin are first heated while being pressed to form a cured, shaped body before carbonizing.

By placing the honeycomb precursor in a graphite vessel filled with graphite particles to embed the precursor, the regions of the ribbons outside of their adjoined region (contact zones) are obviously separated by graphite spacers (the graphite particles) and the precursor is obviously inserted into a graphite clamping device (the graphite vessel).

The use of the carbon fiber/carbon honeycomb for a batch rack, surface part in an aerospace vehicle, optical component carrier or to build precision machines, as claimed in Claims 26-30, would have been obvious to one of ordinary skill in the art of the use of carbon fiber composite honeycombs.

(6)

Claims 7, 10, 22, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Evans et al. 5,360,500.

Evans et al. teach that honeycomb shaped carbon composites are used to make panels for use in aircraft construction and teach that a carbon fiber preform can be rigidified by carbon

matrix deposited by chemical vapor deposition (CVD) to form a carbon-carbon composite or by pitch- pr resin-char process, all well known (col. 2, lines 5-10).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined by using either CVD, pitch- or resin-char process to achieve the desired specific gravity, as taught by Evans et al., as the well known processes of rigidifying a carbon fiber preform to make a carbon-carbon composite. The use of either of pitch impregnation, resin impregnation or CVD would have been obvious to one of ordinary skill in the art.

The use of the carbon fiber/carbon honeycomb for a surface part in an aerospace vehicle, as claimed in Claims 27 and 28, would have been obvious to one of ordinary skill in the art, as taught by Evans et al.

(7)

Claims 7, 10 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Rey et al. 6,110,535.

Rey et al. teach that thermostructural composite material such as carbon-carbon composites are densified by impregnating the preform with a matrix precursor in liquid state or by chemical vapor infiltration or a combination of both methods. Rey et al. further teach that residual internal pore space in communication with the outside of the part is present and teaches that in carbon composite materials used in high temperature fields such as in aviation, the properties can be improved by incorporating molten silicon to lead to internal silicon carbide protection against oxidation by reaction between the carbon of the composite and the molten silicon (col. 1, line 20 – col. 2, line 9).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined by using either chemical vapor infiltration or liquid impregnation or both to densify the composite to achieve the desired specific gravity, as taught by Rey et al., as methods used to densify carbon-carbon composites. The use of either pitch impregnation or resin impregnation and/or chemical vapor infiltration would have been obvious to one of ordinary skill in the art.

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined by infiltrating the carbon composite honeycomb with molten silicon to react with the carbon to form silicon carbide, as taught by Rey et al., to form internal silicon carbide protection against oxidation, thus improving the properties of the carbon composite honeycomb.

The use of the carbon fiber/carbon honeycomb for a surface part in an aerospace vehicle, as claimed in Claims 27 and 28, would have been obvious to one of ordinary skill in the art, as taught by Rey et al., as used in high temperature fields such as aviation.

Allowable Subject Matter

(8)

Claims 12-17 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

(9)

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The references disclose methods of making composite honeycomb.

(10)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin Curtis Mayes whose telephone number is 571-272-1234. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Melvin Curtis Mayes
Primary Examiner
Art Unit 1734

MCM
January 5, 2005